IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of:	
Chin Hin Oon et al.	
Attorney Docket 70040134-1	Examiner: Jade R Callaway
Serial No. 10/804,286	Group Art Unit: 2872
Filing Date: March 18, 2004	Confirmation No. 7809
For: COLOR FILTER AND METHOD FOR FABRICATING THE SAME	

APPEAL BRIEF

To: Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Appellants herewith respectfully submit the following appeal brief.

This brief contains items under the following headings as required by 37 CFR §41.37 and MPEP §1206:

1. Real Party In Interest
2. Related Appeals, Interferences and Judicial Proceedings
3. Status of Claims
4. Status of Amendments
5. Summary of Claimed Subject Matter
6. Grounds of Rejection to be Reviewed on Appeal
7. Argument

Appendix A	Claims
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Appendix C	Related Proceedings

1. REAL PARTY IN INTEREST

The real party in interest in the above-referenced patent application is Avago Technologies ECBU IP (Singapore) Pte. Ltd., having an address at No. 1 Yishun Avenue 7, Singapore 768923.

2. RELATED APPEALS AND INTERFERENCES

Appellants and the undersigned attorney are not aware of any other appeals or interferences which will directly affect or be directly affected by or having a bearing on the Board's decision in the pending appeal.

3. STATUS OF CLAIMS

Claims 1-11 are currently pending in the present application. The Appellants are appealing the rejections of claims 1-11. See, Claims Appendix.

Claims 1, 2 and 4-6 stand rejected under 35 U.S.C. 102(b) as being anticipated by Suda, U.S. Patent No. 5,166,784. Claims 3 and 7-11 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Suda.

4. STATUS OF AMENDMENTS

No amendments were filed or entered subsequent to the Final Office Action of September 7, 2007.

5. SUMMARY OF THE CLAIMED SUBJECT MATTER

The invention as claimed is summarized below with reference numerals and references to the specification and

drawings. The invention is broadly set forth in the language corresponding to independent claims 1 and 8. Discussions about elements of the invention can be found at least in the locations in the specification and drawings cited in the claims below.

1. A color filter comprising:

a primary filter layer (61, 62, 63) [paragraph 20, FIG. 4], that is partially transparent to light, said primary filter layer having a transmission function (71, 72, 73) [paragraph 20, FIG. 5], as a function of wavelength said transmission function varying as a function of the spatial location on said primary filter layer, said primary filter transmitting light in a first band of wavelengths about a first characteristic wavelength at a first location in said primary filter layer and transmitting light in a second band of wavelengths about a second characteristic wavelength at a second location in said primary filter layer; and

a first trim filter (70, FIG. 4) [paragraphs 17, 19, 20, FIG. 4] comprising a layer of material that overlies said first and second locations and that preferentially attenuates light at a first trim wavelength between said first and second characteristic wavelengths, said first trim filter having a transmission function (70, FIG. 5) as a function of wavelength that is substantially the same at said first and second locations, wherein said first trim filter transmission function is selected to selectively block light at edges of said first and second bands of wavelengths that is not blocked by said primary filter layer transmission function, whereby said primary filter layer and said first trim filter together have a target transmission function transmitting a desired set of wavelengths.

8. A method for fabricating a color filter, said method comprising:

bonding [paragraphs 23, 24, 27, FIG. 8] a first trim filter layer (e.g., 121) to a substrate (101);

bonding a primary filter layer (131, 132, 133) [paragraph 25, FIG. 9] that is partially transparent to light to said first trim filter layer, said primary filter layer having a transmission function as a function of wavelength, said transmission function varying as a function of the spatial location on said primary filter layer, said primary filter transmitting light in a first band of wavelengths about a first characteristic wavelength at a first location in said primary filter layer and transmitting light in a second band of wavelengths about a second characteristic wavelength at a second location in said primary filter layer;

wherein said first trim filter layer comprises a layer of material that overlaps said first and second locations and that preferentially attenuates light at a first trim wavelength between said first and second characteristic wavelengths, said first trim filter having a transmission function as a function of wavelength that is substantially the same at said first and second locations, and wherein said first trim filter transmission function is selected to selectively block light at edges of said first and second bands of wavelengths that is not blocked by said primary filter layer transmission function, whereby said primary filter layer and said first trim filter together have a target transmission function transmitting a desired set of wavelengths [paragraphs 17, 19, 20].

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Appellants appeal the final rejection of claims 1, 2 and 4-6 under 35 U.S.C. 102(b) as being anticipated by Suda, U.S. Patent No. 5,166,784. Appellants also appeal the final rejection of claims 3 and 7-11 under 35 U.S.C. 103(a) as being unpatentable over Suda.

7. ARGUMENT

I. Rejection of claims 1, 2 and 4-6 under 35 U.S.C. 102(b)

CLAIM 1

Claim 1 is reprinted as follows for convenience:

A color filter comprising:

a primary filter layer that is partially transparent to light, said primary filter layer having a transmission function as a function of wavelength said transmission function varying as a function of the spatial location on said primary filter layer, said primary filter transmitting light in a first band of wavelengths about a first characteristic wavelength at a first location in said primary filter layer and transmitting light in a second band of wavelengths about a second characteristic wavelength at a second location in said primary filter layer; and

a first trim filter comprising a layer of material that overlies said first and second locations and that preferentially attenuates light at a first trim

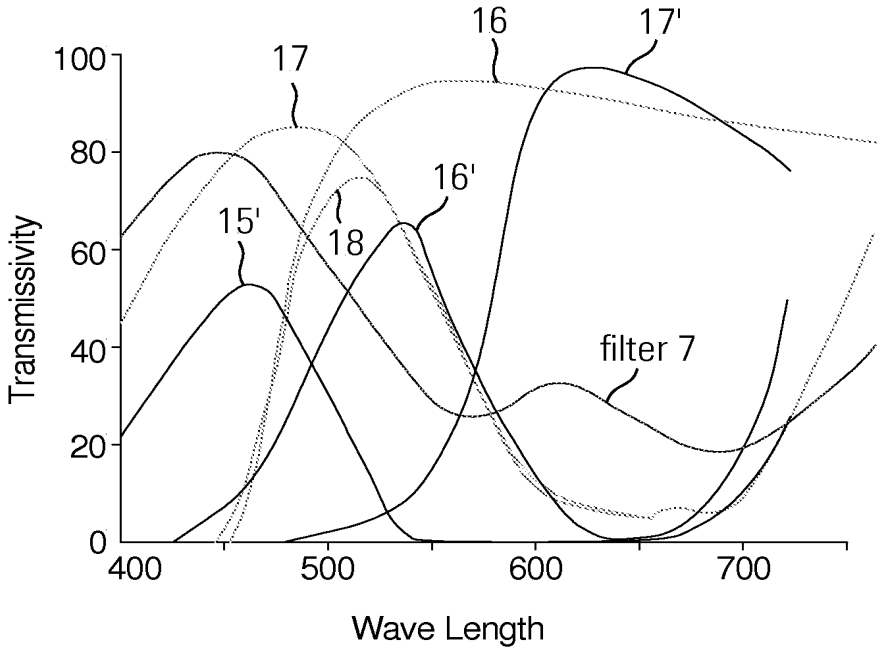
wavelength between said first and second characteristic wavelengths, said first trim filter having a transmission function as a function of wavelength that is substantially the same at said first and second locations, **wherein said first trim filter transmission function is selected to selectively block light at edges of said first and second bands of wavelengths that is not blocked by said primary filter layer transmission function, whereby said primary filter layer and said first trim filter together have a target transmission function transmitting a desired set of wavelengths.**

Appellants believe that the currently pending claims are allowable over Suda at least because Suda does not disclose or suggest that the "first trim filter transmission function is selected to selectively block light at edges of at least one of said first and second bands of wavelengths that is not blocked by said primary filter layer transmission function, whereby said primary filter layer and said first trim filter together have a target transmission function transmitting a desired set of wavelengths."

The Examiner has read the trimming functionality of Appellants' claims into Suda's filter 7 based on a comparison of portions of Suda's FIGS. 10 and 12. Specifically, the Examiner indicates that the minimum in the transmission curve of filter 7 attenuates wavelengths along the falling edge of curve 16' and the rising edge of curve 17'. While this is true, it considers only a small portion of the transmission curve of filter 7 as compared to FIG. 10, ignoring the rest, and ignoring filter 7's application to FIG. 4 as also taught by Suda. More importantly, it ignores the explicit teaching of Suda about the purpose and functionality of filter 7. Appellants respectfully disagree that Suda's wavelength vs

transmissivity plots have sufficient detail or clarity to use as a basis for attributing purpose and functionality in this way. Appellants believe rather that the explicitly stated purpose and function given by Suda in the detailed description for Suda's filter 7 should be relied on, instead of ignoring Suda's explicit description and relying on comparisons of portions only of multiple plotted curves. Suda is silent as to the purpose for the specific shape of the transmission curve of filter 7, stating only that filter 7 is a "bluish filter" (col. 9, line 15) and that "[t]he transmissivity characteristics of the spectral distribution correction filter 7 are determined to minimize the output differences corresponding to the colors of the color separation filters in the sensor according to the transmissivity characteristics of the color separation filters in the solid-state color image sensor and the spectral sensitivity characteristics of the photoelectric transducer elements." (Col. 9, lines 30-37) The problem being solved by Suda using filter 7 is to normalize the spectral sensitivity levels of the three color sensors, as discussed at col. 8, line 55 to col. 9, line 8. The cyan sensor output is lower than the green sensor output, which is lower than the yellow sensor output. Suda teaches that amplifiers may be used to correct this imbalance, but that it becomes complicated. Suda teaches the use of filter 7 as the preferred alternative to amplifiers to solve this problem. Clearly, Suda does not disclose filter 7 to be a trim filter as in Appellants claims.

To illustrate the inutility of trying to interpret portions of Suda's plots to read Appellants claimed trimming functionality into filter 7, the plots of Suda's figures 4, 10 and 12 have been combined in a single figure shown below. The axes have been scaled so that the plots could be correctly superimposed.



The green plot lines 16, 17 and 18 are taken from Suda's FIG. 4, wherein line 16 is the transmissivity of a yellow filter 533, line 17 is the transmissivity of a cyan filter 531, and line 18 is the transmissivity of a green filter 532 (being a combination and thus a product of the yellow and cyan filters 533 and 531). The black plot lines 15', 16' and 17' are taken from Suda's FIG. 10. (Suda does not give a definition of what colors each of the black plot lines 15', 16' and 17' are.) The blue line is the transmission curve of filter 7 taken from Suda's FIG. 12.

Appellants take particular note that Suda teaches that the filter 7 can be used **both** with the cyan, yellow and green filters of FIG. 4, or the red, green and blue filters of FIG. 10:

> "As shown in FIG. 11, the spectral distribution correction filter 7 is arranged in the optical path. In this embodiment wherein the original illumination lamp

having the spectral distribution (FIG. 3) of the light emitted from the lamp, **the color separation filters having the transmissivity curves (FIG. 4), and the photoelectric transducers having the spectral sensitivity curve (FIG. 5) are used, the filter having the transmissivity curve in FIG. 12 is used.**"
(Suda, col. 9, lines 6-15, emphasis added)

"If the lamp having the characteristics (FIG. 3), **the color separation filters having the characteristics (FIG. 10), and the photoelectric transducer elements having the characteristics (FIG. 5) are used, the spectral distribution correction filter 7 may have the transmissivity characteristics in FIG. 12.**"
(Suda, col. 9, line 66 - col. 10, line 3, emphasis added)

Thus, Suda's filter 7 is not tailored for particular use with the transmissivity patterns of either set of filters, despite the fact that Suda's two sets of filters (from FIG. 4 and FIG. 10) have substantially different transmissivity patterns. Appellants therefore respectfully believe that it is completely wrong to ignore Suda's explicitly stated purpose and functionality for filter 7 and try to read in a different purpose corresponding with Appellants claims based on a comparison of one portion of Suda's FIG. 12 with Suda's FIG. 10. For example, if Suda's filter 7 is used with the filters of FIG. 10, the 560nm minimum of filter 7's transmission curve does line up with the falling edge of curve 16' and the rising edge of curve 17', as noted by the Examiner. However, filter 7 has an amplifying, not trimming, effect on the 500nm rising edge of curve 16'. When Suda's filter 7 is used with the filters of FIG. 4, it has asymmetrical affects on curves 16, 17, and 18, rather than the trimming function of Appellants

claims, despite Suda's teaching that filter 7, with the transmissivity curve of FIG. 12, can be used with the filters of FIG. 4.

Again, the explicit teaching of Suda regarding filter 7 is "The transmissivity characteristics of the spectral distribution correction filter 7 are determined to minimize the output differences corresponding to the colors of the color separation filters in the sensor according to the transmissivity characteristics of the color separation filters in the solid-state color image sensor and the spectral sensitivity characteristics of the photoelectric transducer elements." Even if one portion of Suda's transmissivity pattern for filter 7 happens to trim one portion of an edge of a color band when used with the Suda's filters of FIG. 10, the transmission function of Suda's filter 7 is **not** "selected to selectively block light at edges of said first and second bands of wavelengths that is not blocked by said primary filter layer transmission function" as in Appellants claim 1. Suda explicitly states that filter 7 is designed for a completely different purpose, and a complete consideration of the transmission curves of filter 7 with the filters of FIG. 4 and FIG. 10 confirms that Suda's filter 7 is not a trim filter as in Appellants claims.

CLAIMS 2 and 4-6

Solely for the purposes of this appeal, claims 2 and 4-6 stand or fall with claim 1.

II. Rejection of claims 3 and 7–11 under 35 U.S.C. 103(a)

CLAIMS 3 and 7

Solely for the purposes of this appeal, claims 3 and 7 stand or fall with claim 1.

CLAIM 8

Claim 8 is reprinted as follows for convenience:

> A method for fabricating a color filter, said method comprising:
>
> **bonding a first trim filter layer to a substrate;**
>
> **bonding a primary filter layer that is partially transparent to light to said first trim filter layer,** said primary filter layer having a transmission function as a function of wavelength, said transmission function varying as a function of the spatial location on said primary filter layer, said primary filter transmitting light in a first band of wavelengths about a first characteristic wavelength at a first location in said primary filter layer and transmitting light in a second band of wavelengths about a second characteristic wavelength at a second location in said primary filter layer;
>
> wherein said first trim filter layer comprises a layer of material that overlaps said first and second locations and that preferentially attenuates light at a first trim wavelength between said first and second characteristic wavelengths, said first trim filter having a transmission function as a function of wavelength that

is substantially the same at said first and second locations, and **wherein said first trim filter transmission function is selected to selectively block light at edges of said first and second bands of wavelengths that is not blocked by said primary filter layer transmission function, whereby said primary filter layer and said first trim filter together have a target transmission function transmitting a desired set of wavelengths.**

Appellants repeat the arguments for allowability set forth above with respect to claim 1, but specifically directed to the method set forth in claim 8. Again, Suda's filter 7 is designed to "minimize the output differences corresponding to the colors of the color separation filters in the sensor according to the transmissivity characteristics of the color separation filters in the solid-state color image sensor and the spectral sensitivity characteristics of the photoelectric transducer elements." (Col. 9, lines 30-37) Suda's filter 7 is **not** "selected to selectively block light at edges of said first and second bands of wavelengths that is not blocked by said primary filter layer transmission function" as in Appellants claim 8.

Furthermore, Suda does not disclose or suggest bonding a trim filter layer to a substrate and bonding a primary filter layer to the trim filter layer.

CLAIMS 9-11

Solely for the purposes of this appeal, claims 9-11 stand or fall with claim 8.

In view of the above, all of the claims are believed to be in condition for allowance, and the Appellants respectfully request reversal of the rejection.

Respectfully submitted,
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Claims Appendix

1. (Previously presented) A color filter comprising:

a primary filter layer that is partially transparent to light, said primary filter layer having a transmission function as a function of wavelength said transmission function varying as a function of the spatial location on said primary filter layer, said primary filter transmitting light in a first band of wavelengths about a first characteristic wavelength at a first location in said primary filter layer and transmitting light in a second band of wavelengths about a second characteristic wavelength at a second location in said primary filter layer; and

a first trim filter comprising a layer of material that overlies said first and second locations and that preferentially attenuates light at a first trim wavelength between said first and second characteristic wavelengths, said first trim filter having a transmission function as a function of wavelength that is substantially the same at said first and second locations, wherein said first trim filter transmission function is selected to selectively block light at edges of said first and second bands of wavelengths that is not blocked by said primary filter layer transmission function, whereby said primary filter layer and said first trim filter together have a target transmission function transmitting a desired set of wavelengths.

2. (Previously presented) The color filter of Claim 1 where said first trim filter further preferentially attenuates light at a second trim wavelength, said first trim wavelength being less than one of said first and second characteristic wavelengths and said second trim wavelength being greater than said one of said first and second characteristic wavelengths.

3. (Original) The color filter of Claim 1 wherein said first trim filter comprises an interference filter.

4. (Original) The color filter of Claim 1 wherein said primary filter layer comprises a first dye filter located at said first location and a second dye filter located at said second location.

5. (Original) The color filter of Claim 4 wherein said first and second dye filters are located on said first trim filter layer.

6. (Original) The color filter of Claim 1 further comprising a second trim filter, said second trim filter comprising a layer of material that preferentially attenuates light at a second wavelength that is different from each of said characteristic wavelengths and said first trim wavelength.

7. (Original) The color filter of Claim 6 wherein said dye filters are located between said first and second trim filters.

8. (Previously presented) A method for fabricating a color filter, said method comprising:

bonding a first trim filter layer to a substrate;

bonding a primary filter layer that is partially transparent to light to said first trim filter layer, said primary filter layer having a transmission function as a function of wavelength, said transmission function varying as a function of the spatial location on said primary filter layer, said primary filter transmitting light in a first band of wavelengths about a first characteristic wavelength at a first location in said primary filter layer and transmitting

light in a second band of wavelengths about a second characteristic wavelength at a second location in said primary filter layer;

wherein said first trim filter layer comprises a layer of material that overlaps said first and second locations and that preferentially attenuates light at a first trim wavelength between said first and second characteristic wavelengths, said first trim filter having a transmission function as a function of wavelength that is substantially the same at said first and second locations, and wherein said first trim filter transmission function is selected to selectively block light at edges of said first and second bands of wavelengths that is not blocked by said primary filter layer transmission function, whereby said primary filter layer and said first trim filter together have a target transmission function transmitting a desired set of wavelengths.

9. (Previously presented) The method of Claim 8 where said first trim filter layer also preferentially attenuates light at a second trim wavelength, said first trim wavelength being less than one of said characteristic wavelengths and said second trim wavelength being greater than said one of said characteristic wavelengths characteristic wavelengths.

10. (Original) The method of Claim 8 wherein said first trim filter layer comprises a plurality of transparent layers in which adjacent layers have different indices of refraction.

11. (Original) The method of Claim 8 further comprising bonding a second trim filter layer to said color filter layer such that said color filter layer is between said first and second trim filter layers, wherein said second trim filter

layer comprises a layer of material that overlaps said first and second locations and that preferentially attenuates light at a second trim wavelength that is different from said first trim wavelength, said first characteristic wavelength, and said second characteristic wavelength, said second trim filter layer having a transmission function as a function of wavelength that is substantially the same at said first and second locations.

Evidence Appendix

None.

Related Proceedings Appendix

None.